

form is light brown, varying to a rather darker tint. According to Barrett the smoky form was first described from London, about 1870; it now occurs at Birmingham and other large towns, and is prevalent in south Yorkshire. A coal-black form is recently recorded from Norwich, and a rather less dark variety from Scotland and Cannock Chase. Durham, Northumberland, medium prevalent, light scarce, very dark prevalent at Newcastle, and a dark form occurs at Durham (Robson, Rosie). Chester, Delamere, medium prevalent, very dark fairly common (Arkle). Sheffield, rather dark, no great variation (Brady, Doncaster). Midlands and southern counties, light brown generally prevalent, tending to grey in chalky districts, rather dark from Reigate, Bristol, Ashdown Forest (Prideaux), and occasional rather dark specimens from Kent and Gloucestershire (Hewett, Davis). Norwich, occasional quite black ♂ (Pitman). Berlin, rather dark form now commoner than light, appeared some twelve years ago (Kloos).

HYBERNIA PROGEMMARIA (MARGINARIA).—The typical light form is characteristic of the south of England, a rather darker reddish-brown form is found in Ireland, Scotland, and is prevalent in the north of England; it occurs also around London, in Gloucestershire, Bristol, etc. A uniform smoky variety appeared in south Yorkshire less than 40 years ago, it has become commoner, and is spreading to the neighbouring counties. Only light and medium are recorded from Kent, Sussex, Surrey, Berks, Devon, Hereford, Norwich, Suffolk, most of Scotland. Dark occurs occasionally in Essex (Harwood), Cambridgeshire (Farren), fully dark appeared at Lynn between 1900 and 1904 (Baker). Huddersfield, rather light, medium, dark, all abundant; 40 years ago the rather light form was the only one known, now the dark medium is prevalent, and the very dark form up to 20%. The females are now nearly all fully dark (Porritt). Yorkshire, Sheffield, Cheshire, Liverpool, Chilwell (Notts), medium prevalent, light common, dark not uncommon (Hewett, Doncaster, Arkle, Tait, Pearson). At Sheffield the smoky suffusion has increased greatly in 15-20 years (Doncaster). Durham, Northumberland, light prevalent, formerly commoner; smoky not uncommon, appeared within about 25 years (Robson). At Sunderland a race exists with smoky forewings, but light hindwings (Brady). Smoky form occurs occasionally at Windermere, Lynn, Birmingham, Stroud (Davis), Bristol (Prideaux), it occurs in a small isolated locality at Paisley (Stewart). In districts where the dark forms occur, black females are more abundant than fully dark males. A black female paired with dusky male (from Yorkshire) gave 35 males all dusky in varying degrees, all females dark (Adkin).

(To be continued.)

Butterflies at Rest.

By DR. T. A. CHAPMAN.

Dr. Longstaff has called our attention to the resting attitude of butterflies, and records observations that we all recognise as having made, at some time or other, without knowing it, and certainly without having co-ordinated them, either together or with any general principle. Dr. Longstaff especially directs our attention to the cryptic value of these attitudes, either temporarily, or during the long daily rest of some eighteen hours. The attitudes which have more par-

ticularly attracted my attention are rather what might be called the attitudes when settled, rather than when at rest, *i.e.*, the attitudes assumed for a few seconds, or minutes, during the period of daily activity. That these two series of attitudes are closely related to, and have considerable value in explaining, each other, is no doubt the case. Indeed, the temporary attitude no doubt leads up to, and possibly originates, the true resting attitude. This follows from the circumstance that when the butterfly is temporarily resting a sudden failure of sunshine may necessitate its accepting as, or at any rate changing at once into, the permanent attitude that which it then has. There is nevertheless a certain antithesis between the two attitudes. Dr. Longstaff shows that the prolonged resting attitude has reference principally to effective hiding. I have always regarded the temporary attitude as pointing, on the contrary, to effective display, and especially to securing a maximum solar radiation.

The *Vanessas* illustrate most pointedly the difference of the two attitudes and the obvious connection between them. All the species I know are fond of settling on a road, a stone, a wall, or other bare place; immediately they turn their tails to the sun, and, after a slight flap or two, lay the wings flat on the ground, indeed more than flat, as the head is somewhat raised, and the borders of the wings touch the ground all round—the position that is given to an insect in the good old-fashioned English setting (indeed this setting is probably in reality an attempt to reproduce this butterfly attitude). The insect in this way receives a maximum of sunshine, whether because he finds it grateful and comforting I do not know, but it certainly, by securing a maximum amount of light, gives the colours the greatest brilliance they admit of, and it would be difficult to surpass the display made by a *Pyrameis atalanta*, *Vanessa io*, or *Euvanessa antiopa* so resting. How closely this is related to the prolonged resting attitude is obvious, since it is at once assumed, if the wings be thrown back, as occurs during any temporary passing of a cloud over the sun.

I have taken a recent opportunity of seeing a few butterflies at Hyères, to refresh my recollection on some of these points. *Callophrys rubi* when it settles instantly makes a curious little twist and twinkle. I had never tried to understand what this meant, but I have recently had the opportunity of carefully watching the same movement made by *Thestor ballus*, as well as observing *C. rubi* itself. The movement, which is almost part of the process of settling, places the insect at once, with one side (without preference for either) towards the sun, the wings closed, and the sun vertical to the exposed undersurface; *T. ballus* will settle on the ground, but by preference on some portion of a plant, and *C. rubi* invariably on the leaves of some tree or shrub. Such, at least, was the case at Hyères, where the butterfly was abundant in some places. At Ste. Maxime, however, a little later, where it was equally common, it was rather fond of settling on stones and pathways. I feel confident that this difference of habit in the species at the two localities was real, and not due to any serious defect of observation, though it is possible that occasionally a *C. rubi* on the ground may have been mistaken for *T. ballus*. Had the absence of *T. ballus* at Ste. Maxime anything to do with the different habit of *C. rubi*?

When on the ground *T. ballus* secures no cryptic advantage, but

both species certainly do when on vegetation, though there is also a maximum exposure to the sun as well as a maximum of display. Neither insect ever shows the upper surface when resting, not even the coloured *T. ballus* ♀. The paradox that this attitude secures both the maximum of display and a large amount of cryptic effect, I find difficult to deal with, nor can I form any opinion as to whether the butterfly is more or less conspicuous owing to the special orientation, but certainly one side of the insect secures a vertical exposure to the sun's rays.

Gonepteryx cleopatra, *Colias edusa*, and *C. hyale* frequently orient themselves in the same manner, and none of these ever show the upperside when at rest, whilst the white Pierids seem to orient themselves, when they do so at all, with reference to the direction of the wind, and with no relation to the sun. A good many butterflies rest just like the Vanessas, except that the wings are not strongly deflexed, but slightly raised, of which the Melitæas (e.g., *Melitæa cinxia*), and Hesperias (e.g., *Hesperia malvae*), may be given as examples. The orientation is precisely the same.

The Lepidoptera of the southeastern district of London.

By WILLIAM WEST.

(Continued from vol. xviii., p. 143.)

ÆGERIIDES.—*Æ. formiciformis*.—Plumstead, on osier; 1879. *Æ. ichneumoniformis*.—Captured one specimen sweeping the railway-bank at Lee, in 1877. *Æ. cynipiformis*.—Larvæ and pupæ under bark of oak in Darenth Wood, in June, 1870; two imagines taken in Burnt Ash Lane, at rest on oak-leaves in 1870; also one in Greenwich Park, on the trunk of an elm. *Æ. tipuliformis*.—In my own garden at Greenwich, at rest on currant leaves in 1864, 1866, and 1867.

ZEUZERIDÆ.—*Zeuzera pyrina*.—Bred from whitethorn, lilac, and apple-trees, at Greenwich.

COSSIDÆ.—*Cossus cossus*.—Larvæ in an elm in Greenwich Park; in a birch at Shirley, and also in willows at Lee and Lewisham.

HEPIALIDÆ.—*Hepialus hectus*.—At West Wickham Wood, Shooter's Hill, and also Shirley. *H. lupulinus*.—Lee, Greenwich, Lewisham, and in many other places. *H. sylrinus*.—At Lee, Wickham, and Dartford. *H. humuli*.—Found at Greenwich, Lee, Lewisham, and many other places.

EUCLEIDÆ.—*Cochlidion limacodes (testudo)*.—West Wood, on Shooter's Hill, in June, 1863, and also found in Swanscombe Wood in 1865.

ADSCITIDÆ.—*Adscita sticticus*.—In Loughton, 1864. *A. geryon*.—Box Hill, 1868. *Anthrocera trifolii*.—Loughton, in a field near "the Owl," 1865. *A. pilipendulæ*.—Box Hill, Lee, Forest Hill; in a field, annually, at the top of Burnt Ash Lane, from 1865.

NOLIDÆ.—*Nola cucullatella*.—Blackheath, on fences; larvæ on whitethorn, at Kidbrook, Lee, Lewisham, etc.

ARCTIDÆ.—*Nudaria senex*.—Lee pit, a sallow swamp at the top of Manor Farm. *N. mundana*.—On fences at Blackheath. *Setina irror-ella*.—Caterham, in June, and Box Hill. *Calligenia miniata*.—Darenth Wood, and in West Wood, Shooter's Hill. *Lithosia aureola*.—Darenth Wood. *L. deplana*.—Beating yews at Box Hill, in July and August.